



California  
Department of  
Transportation

# traffic manual





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STATE OF CALIFORNIA  
BUSINESS, TRANSPORTATION AND HOUSING AGENCY  
DEPARTMENT OF TRANSPORTATION

# *Traffic Manual*

Issued by the  
DEPARTMENT OF TRANSPORTATION



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Governor

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# Foreward

## **Purpose**

Except as provided for under the next heading, Rules and Regulations, this manual establishes engineering guidelines, policies and procedures for traffic functions of the California Department of Transportation (Caltrans). It is in substantial conformance with the Manual On Uniform Traffic Control Devices published by the Federal Highway Administration (FHWA). This manual is subject to all state statutes, in particular the California Vehicle Code.

Many of the instructions given herein are subject to amendment as conditions and experience warrant. Special situations may call for variation subject to sound engineering judgment. On state highways significant variations are subject to Headquarters approval. This manual is not intended to be a substitute for engineering knowledge, experience or judgment. It contains material that is intended to serve as an aid in the solution of various traffic situations. It is not intended that any standard of conduct or duty toward the public shall be created or imposed by the publication of this manual. Statements as to duties and responsibilities of any given classification of state officers or employees mentioned herein refer solely to duties or responsibilities owed by those in such classification to their superiors. However, in their official contacts, employees should recognize the necessity for good relations with the public.

## **Rules and Regulations**

The only provision in this manual which has been adopted by the Department of Transportation as rules and regulations and which, therefore, has the force and effect of law is Chapter Eleven. These Rules and Regulations were adopted pursuant to the authority of California Vehicle Code sections 21400 and 21401. Local jurisdictions are to use these rules and regulations accordingly.

## **Traffic Safety Program**

This manual contains current highway design standards, criteria and policies. Design standards have evolved over a period of many years; consequently,

many existing roads do not fully conform with current standards. It is not economically feasible to upgrade all roads to current design standards; however, certain roadway features may be upgraded where it is cost-effective to do so. The Traffic Safety Program has been developed to identify and prioritize locations where it is economically feasible to upgrade existing roads to a current design standard. The Traffic Safety Program provides a system which assures that the limited funds available for upgrading existing roads will be spent at locations where it will result in the greatest benefit to the highway user.

## **Scope**

This Manual is not a textbook or a substitute for engineering knowledge, experience or judgment. It includes techniques as well as graphs and tables not ordinarily found in textbooks. These are intended as aids in the quick solution of field and office problems. Except for new developments, no attempt is made to detail basic engineering techniques; for these, standard textbooks should be used.

## **Form**

The loose-leaf form was chosen because it facilitates change and expansion. New instructions will be issued as sheets in the format of this manual; these may consist of additional sheets or new sheets to be substituted for those superseded.

## **Organization of the Manual**

A numbering system is used which permits identification by chapter, section and article. Within a chapter, an article number contains, first, a chapter number, secondly, a dash followed by a two digit section number, and thirdly, a decimal followed by the article number.

Consecutive page numbering is used in this manual. The upper outside corner of each page shows the page number. This number is composed of a chapter number, a dash and the actual page number.

The date of each page is shown under the page number.

## *Common Metric Conversion Factors*

Class	Multiply:	By:	To Get:
Area	ft <sup>2</sup> yd <sup>2</sup> mi <sup>2</sup> acre	0.0929 0.8361 2.590 0.40469	m <sup>2</sup> m <sup>2</sup> km <sup>2</sup> ha
Length	ft in mi yd	0.3048 25.4 1.6093 0.9144	m mm km m
Volume	ft <sup>3</sup> gal fl oz yd <sup>3</sup> acre ft	0.0283 3.785 29.574 0.7646 1233.49	m <sup>3</sup> L* mL* m <sup>3</sup> m <sup>3</sup>
Mass	oz lb kip (1,000 lb) short ton (2,000 lb) short ton	28.35 0.4536 0.4536  907.2 0.9072	g kg tonne (1,000 kg)  kg tonne (1,000 kg)
Density	lb/yd <sup>3</sup> lb/ft <sup>3</sup>	0.5933 16.0185	kg/m <sup>3</sup> kg/m <sup>3</sup>
Pressure	psi ksi lb <sub>f</sub> /ft <sup>2</sup>	6894.8 6.8948 47.88	Pa MPa (N/mm <sup>2</sup> ) Pa
Velocity	ft/s mph mph	0.3048 0.4470 1.6093	m/s m/s km/h
Temperature	°F	$t^{\circ}\text{C} = (t^{\circ}\text{F} - 32)/1.8$	°C
Light	footcandle (or) lumen/ft <sup>2</sup>	10.7639	lux (lx) (or) lumen/m <sup>2</sup>

\*Use capital "L" for liter to eliminate confusion with the numeral "1".